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SCIENTISTS TO MAP EARTH

Shuttle mission will help make flying safer

Future airline passengers have a stake in next week's mission of the Space Shuttle Endeavour.

Endeavour is set to lift off Jan. 31 on an 11-day mission that will produce the most accurate and complete topographic map of the Earth's surface ever assembled. That terrain information will be used by the NASA Aviation Safety Program, headquartered at the Langley Research Center in Hampton, Va., to help develop Synthetic Vision for pilots and make flying commercial and private aircraft safer.

The Shuttle Radar Topography Mission (SRTM) is designed to collect three-dimensional measurements of nearly 80 percent of the Earth's land surface with an accuracy of better than 53 feet. It is an international project sponsored by the National Imagery and Mapping Agency, NASA, the German Aerospace Center and the Italian Space Agency.

SRTM will build on Spaceborne Imaging Radar-C technology that flew twice on Endeavour in 1994. To collect the topographic images, engineers will add an almost 200-foot-long mast, additional C-band imaging antennae, and improved tracking and navigation devices. The mast, the longest rigid structure ever to be flown in space, will extend sideways from the orbiter's cargo bay. The antennae at the tip will allow the system to acquire stereo-like radar images of the Earth's surface through a technique called interferometry.

Scientists will then use the 3-D images to generate computer versions of topographic maps, called digital elevation models, that can be used for a large number of scientific, civilian and military applications.

One of those is Synthetic Vision, a revolutionary cockpit display system that would give pilots a clear, electronic picture of what's ahead outside their windows, no matter what the weather or time of day.

Limited visibility is the greatest contributing factor in the world's deadliest aviation accidents, according to Michael Lewis, NASA Aviation Safety Program (AvSP) director. "When you can't see out the window of the aircraft either at night or in poor visibility conditions, accidents can happen. So for the traveling public, if we are successful 30 percent of all fatal accidents would basically be eliminated."

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AvSP is working with a number of industry teams to create and refine Synthetic Vision. NASA researchers envision a system that would use new and existing technologies to incorporate data into displays in aircraft cockpits. The displays would show terrain, ground obstacles, air traffic, landing and approach patterns, runway surfaces and other relevant data to the flight crew.

NASA tested a prototype of Synthetic Vision in flights over Asheville, N.C. last year. Engineers loaded an experimental terrain database that had been augmented by sophisticated computer rendering techniques onto a "flying simulator" research aircraft owned by the Air Force. During tests pilots assessed how those three-dimensional images of the area compared with the real out-the-window scene. One pilot commented during a flight, "The terrain picture, the synthetic vision display, is just terrific. I find myself forgetting that that's not the real world I'm looking at."

It's expected to take about 18 months to process the terrain data from the shuttle mission. AvSP officials hope a Synthetic Vision system can be available commercially in five years.

The NASA Aviation Safety Program is a partnership with the Federal Aviation Administration, aircraft manufacturers, airlines and the Department of Defense. This partnership supports the national goal announced by President Clinton to reduce the fatal aircraft accident rate by 80 percent in 10 years and by 90 percent over two and a half decades.

The aviation safety initiative was created in the summer of 1997 by NASA administrator Dan Goldin in response to a report from the White House Commission on Aviation Safety and Security, chaired by Vice President Al Gore. NASA has designated about $550 million over five years for aviation safety research and development, with more funding expected to follow.

Researchers at four NASA field installations are working with the FAA and industry to develop affordable technologies to make flying safer: Langley; Ames Research Center at Moffett Field, Calif.; Dryden Flight Research Center in Edwards, Calif.; and Glenn Research Center in Cleveland, Ohio.

Because of advances in the last 40 years commercial airliners are already the safest of all major modes of transportation. But with an accident rate that has remained relatively constant in the last decade and air traffic expected to go up significantly over the next 20 years, the U.S. government wants to prevent a projected rise in the number of aircraft accidents.

For more information on the NASA Aviation Safety Program please check the Internet at: http://avsp.larc.nasa.gov

For more information on the Shuttle Radar Topography Mission please check the Internet at: http://www.jpl.nasa.gov/srtm

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